

L046.538



PATENT SPECIFICATION

DRAWINGS ATTACHED

L046.538

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COMPLETE SPECIFICATION

Apparatus for Wrapping Sheets Around Tubes such as Cigarettes

- We, VEB TABAK UND INDUSTRIE-MASCHINEN DRESDEN, of 40/58, Zwickauer Strasse, Dresden A 1, Germany; a corporation organised under the laws of Eastern Germany, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—
- 5 The present invention concerns an apparatus for wrapping sheets around tubes and especially for wrapping small connecting sheets around groups formed by two cigarettes having a double tip, in which the sheet first is adhered tangentially to a tube then, by inserting in troughs secured to a revolving rolling drum laid partly around the tube and subsequently rolled around it.
- 10 Devices are known wherein connecting sheets are adhered tangentially to groups received in a grooved drum and which are wrapped in U-shaped manner around the groups by transferring the groups to grooves in a conveyor drum. The parallel ends of the connecting sheets are then wrapped completely around the groups by flaps pivotally arranged on the conveyor drum, by controlled swivel rams or by troughs of a revolving tool which co-operate with the peripheral surfaces of the groups.
- 15 It has also been proposed for the grooves of the conveyor drum to be in the form of troughs pivotally connected to the conveyor drum and rotated by means of guide bars having rollers in a cam track. In this case when a group has been transferred to a trough one limb of the U-shaped connecting sheet to be wrapped around the group is laid against the group by striking against a plate spring directed tangentially in the direction of the group as the trough is rotated, the trough is then rotated in the reverse direction so that the other limb is swept into the original radial position against an endless belt overlapping
- the conveyor drum in this region and operating in synchronism whereby it is folded over.
- 20 In these devices the pressure against the connecting sheets to be folded over must only be slight so that the parts to be connected are not pushed out of the grooves. This makes it possible for dimensional and cross-sectional deviations between cigarettes and filter parts to be compensated only to a very limited extent, so that there is the risk of creases and air pockets being formed on the wrapped connecting sheets.
- 25 Apparatus is also known wherein the connecting sheet is wrapped around the cigarette tip group by rolling the cigarette filter group between a rolling drum and a fixed or revolving counter rolling surface or a revolving belt or even in a rectilinear rolling passage between a wall and a revolving belt.
- 30 In this case the adhesive connection between the connecting sheet and the cigarette tip group is initiated merely by line contact. This line contact is not reliable and with faulty adhesion may cause the leading edge of the sheet to be folded over, and with continued rolling over lead to creasing and air pockets. This risk also occurs when the connecting sheet is rendered tacky before being fed to the rolling passage.
- 35 Finally, apparatus is known wherein the connecting sheet is first adhered to the cigarette tip group and by insertion into a shallow trough is laid around a part of the circumference of the group. The free ends of a connecting sheet are folded over between two rolling surfaces adapted to be displaceable relative to each other, and which are either displaced parallel to one another along a straight path or are concentrically displaced from one another along an arcuate path. The cigarette tip group is rotated relative to the rolling drum without moving from its position in the trough.

[Price 4s. 6d.]

These devices substantially remove the abovementioned deficiencies since the rolling operation takes place only after the connecting sheet has been wrapped around in a U-shaped manner. The necessary shallow construction of the troughs however does not appear sufficient to align the cigarettes and tips, since with shallow troughs displacement of the cigarettes and tips relative to one another is possible. The groups, whilst being rolled over, rub against the trough bottom or become lifted out of the trough. Furthermore the two positions of the troughs permit the groups both to be reliably transferred and wrapped with simple means.

According to the present invention an apparatus for wrapping sheets around tubes, the sheets first being attached tangentially to the tubes, then laid partly around them by insertion in troughs mounted on a rotatable drum, and subsequently rolled around them in a rolling region, is characterised in that one side of each trough extends in a tangential direction relative to the trough inner surface to form a rolling surface, and the troughs are mounted to pivot about axes parallel to the axis of rotation of the drum such that each rolling surface lies in a substantially radially extending direction with respect to the axis of rotation of the drum where the tubes having a sheet attached to them are inserted therein, and is turned to lie at substantially 90° thereto in the rolling region.

In a preferred embodiment the troughs are guided by an endless curved cam path which in a transfer region of the groups from the troughs and also in the rolling region of the groups is concentric with the axis of rotation of the drum.

For rolling the groups an endless belt is arranged in the rolling region and moved in the same direction as the drum but at a lower speed. A central section the endless belt is passed over rollers which are fixed to the trough blocks and are parallel to the rolling surfaces whilst the end sections are passed over reversing or driving guide rollers.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a sectional front elevation,

Fig. 2 shows a curved track with associated rollers and guide rods;

Fig. 3 is a sectional side elevation, and

Fig. 4 is a fragmentary view in the direction of the rolling surface of a trough block.

On the circumference of the grooved drum 1 grooved blocks 2 are secured in the grooves 3 of which groups comprising two cigarettes 4 and a filter tip 5 of double utility length disposed therebetween are retained by suction. Tangentially attached to these groups are gummed connecting sheets 6.

A rolling drum is mounted axially parallel to the grooved drum 1. On the circumference

of the rolling drum at equal spaces apart are shafts 7 mounted in bushes 9 by means of bearing pins 8. Secured to the shafts are trough blocks 10 in which a trough 11 and an adjacent rolling surface 12 extending tangentially therefrom are machined. Straps 13 are secured to the trough blocks 10 and between adjacent straps a roller 14 is mounted by means of bearing pins 15. The bearing pins 8 of the shafts 7 are extended at one end to beyond the bushes 9. Clamped to these extended ends are guide rods 16, to the other ends of which collar bolts 18 are provided for retaining rollers 17. The rollers 17 operate in a cam track 20 machined in a fixed cam disc 19. The rolling drum comprises drum discs 21, a flange bearing 22 and a flange 23. The flange bearing 22 is mounted on an axle 25 by means of bearing bushes 24. This axle is mounted in a holder 28 pressed against the machine housing 27 with screws 26 and secured against rotation by means of a fitting key 29.

The rolling drum is driven by means of a gear wheel 30 and a spur ring 31 fixed to the rolling drum. A bore 33 formed axially in the axle 25 communicates via a hose pipe 32 with a suction air system. By means of further bores 34, 35 and a slot 36 constructed as an annular segment of a circle the supply pipes 37 to the shafts are occasionally connected to the suction air system during rotation of the rolling drum. The suction air thus acts via the air passage 38 and bores 39, 40 on the connecting sheet 6 or the tip-cigarette groups 4, 5.

Over substantially half the rolling drum circumference an endless belt is passed which is supported on rollers 14 and rotates in the direction of rotation of the rolling drum. The speed of this belt however is somewhat lower than the local speed of the rolling surface 12. The endless belt 41 is returned via reversing rollers 42, 43, 44 to the driving roller 45. The driving roller 45 is so driven via gear wheels, not shown, that the speed of the endless belt 41 is constantly at a predetermined ratio to the speed of the rolling drum at the rolling surfaces 12. In the region of the bearing pins 46 of the reversing roller 42 a holder 47 is arranged, to the other end of which a guide rail 48 is secured. The rolling drum has arranged subsequently thereto a further grooved drum 49 having groove blocks 50, to the grooves of which the wrapped groups are retained by suction. The wrapped groups are carried past a revolving cutting device 51, two filter cigarettes being separated thereby and subsequently delivered to a conveying device, not shown.

The method of operation of the apparatus is as follows:

Two cigarettes 4 are received in known manner in the grooves 3 of groove blocks 2 fixed to a grooved drum 1. A tip 5 of double utility length is inserted between the cigarettes

4. The groups formed in this manner are carried past a lining drum, not shown, on which gummed connecting sheets 6 are retained by air suction. When group 4, 5 makes contact with the connecting sheet 6, the suction air on the lining drum is shut off. The connecting sheet 6 now adhered tangentially to the group 4, 5 is carried away thereby. Contrary to prior art, according to which the connecting sheets are attached either in the centre or at their outer edge to the groups, in the example the connecting sheet is so attached to the group that the leading end is considerably shorter than the trailing end. Before the trough blocks 10 arrive in the region of the grooved drum 1, they are swung by the cam track 20 via the roller 17, the collar bolt 18, the guide rod 16 and the bearing pin 8 of the strut in such a manner that the troughs 11 are directed radially outwards and held in this position by a portion of the cam track 20 which is concentric with the rolling drum. The groups 4, 5 are pressed into the troughs 11, the short end of the connecting sheet 6 being wrapped partly about the group and thereby having a hook-like shape. During transfer of the group from the grooves 3 to the troughs 11 the suction air acting in the bottom of the grooves 3 is shut off, whilst the supply pipe 37 arrives in the region of the slot 36 and thereby the group 4, 5 via bores 40 in the bottom of the trough 11 and the long end of the connecting sheet 6 through the bore 39, are sucked against the rolling surface 12. After the transfer the cam track 20 ascends whereby the trough blocks 10 are swung through 90° into the position of the rolling surfaces 12 tangential to the rolling drum by the rollers 17 and the guide rod 16. When this position has been reached the cam track 20 extends concentrically with the rolling drum over a large region in which the driving roller 45 of the endless belt 41 is arranged. The distance of the driving roller 45 to the rolling drum is so maintained that the endless belt 41 is first passed over the roller 14 and the group 4, 5 approaches the belt 41 until the next roller 14 makes contact therewith. This results in a very soft rolling approach of the group 4, 5. If the short end of the connecting sheet 6 laid hook-like around the group 4, 5 is still somewhat remote from the group, then the belt 41 is gradually pressed thereagainst. Between two rollers 14 the endless belt 41 is guided parallel to the rolling surface 12, so that a rolling passage is formed for the given group 4, 5. As the speed of the endless belt 41 is somewhat lower than the peripheral speed of the rolling drum at the rolling surface 12, the groups 4, 5 are rolled slowly over a long limb of the connecting sheet 6. This slow rolling, especially with a comparably high working speed of the rolling drum, has proved to be very expedient, so that even with poor gum qualities it was possible to obtain a satisfactory wrapping without creases and air pockets being formed. Before the endless belt 41 is returned via the reversing roller 42, the rolling over of the group 4, 5 with the connecting sheet 6 is completed. The group is supported against the roller 14 of the subsequent trough block 10, the overlapping seam of the connecting sheet 6 being still compressed for a brief period between rolling surface 12 and belt 41. On returning the belt 41 the groups are retained between a guide rail 48 and the rolling surface 12, until they are transferred on to the grooved blocks 50 of the grooved drum 49 by suction air. They are then carried in conventional manner past a cutting device 51 covering the grooves and subsequently delivered to a conveying or turning device.
- WHAT WE CLAIM IS:—
1. An apparatus for wrapping sheets around tubes, the sheets first being attached tangentially to the tubes, then laid partly around them by insertion in troughs mounted on a rotatable drum, and subsequently rolled around them in a rolling region, characterised in that one side of each trough extends in a tangential direction relative to the trough inner surface to form a rolling surface, and the troughs are mounted to pivot about axes parallel to the axis of rotation of the drum such that each rolling surface lies in a substantially radially extending direction with respect to the axis of rotation of the drum where the tubes having the sheet attached to them are inserted therein and is turned to lie at substantially 90° thereto in the rolling region.
 2. An apparatus as claimed in claim 1, having an endless cam track for engaging with the troughs by means of rollers and guide rods in which the cam track is concentric with the rotatable drum in a transfer region where the tubes are inserted in the troughs and also in the rolling region.
 3. An apparatus as claimed in claims 1 or 2 in which an endless belt, displaceable in the same direction as that of the drums' rotation but at a lower speed, is arranged in the rolling region and in a central section is guided by means of rollers secured to the troughs, and in the end sections by means of reversing or driving guide rollers.
 4. An apparatus, for wrapping a connecting sheet around a group comprising two cigarettes having a double tip therebetween substantially as described with reference to and as illustrated in the accompanying drawings.

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Reference has been directed in pursuance of
Section 9, Subsection (i) of the Patents Act,
1949, to Patent No. 898,760.

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Fig.1

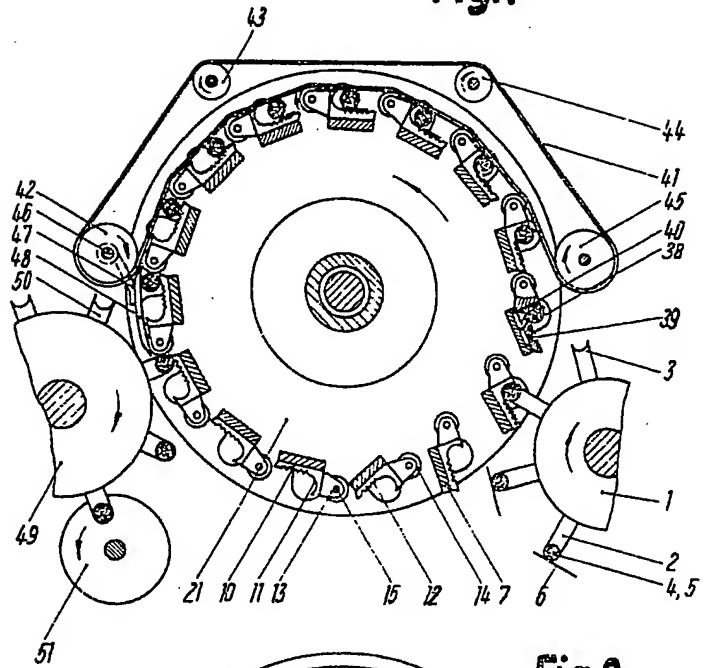


Fig.2

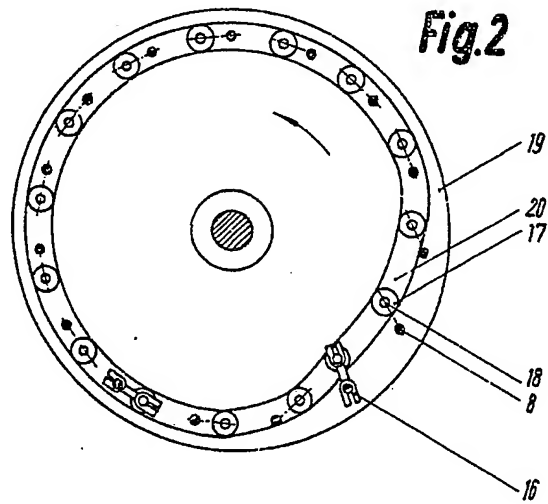


Fig.3

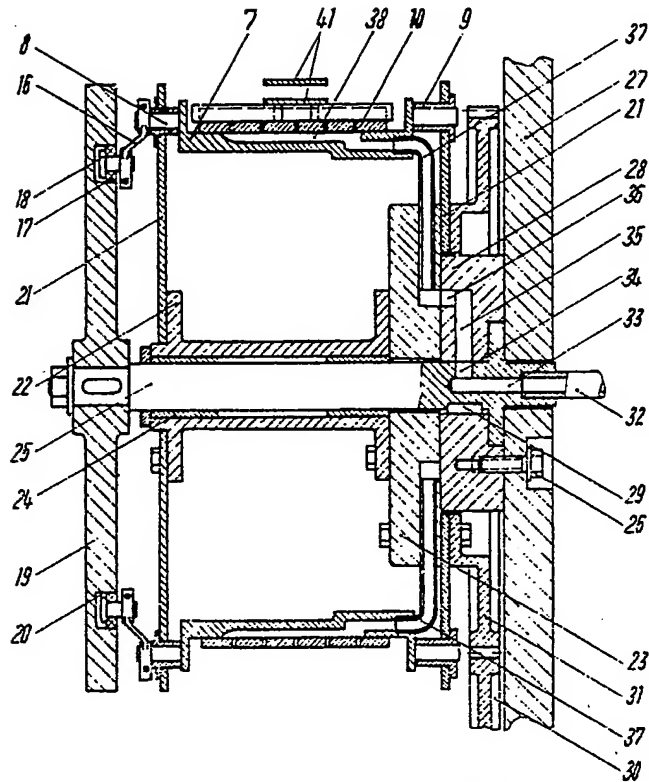
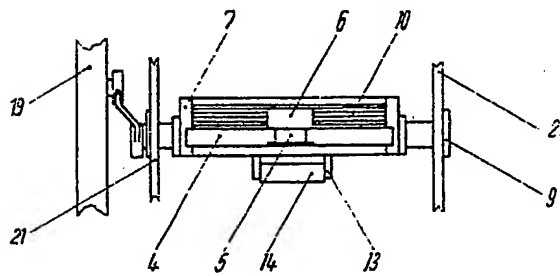


Fig.4



44
 41
 45
 40
 38
 39
 3
 1
 2
 4, 5

2

19
 20
 17

18
 8

16

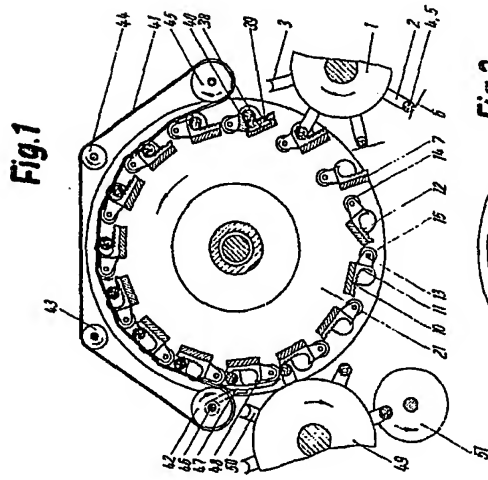


Fig. 1

Fig. 2

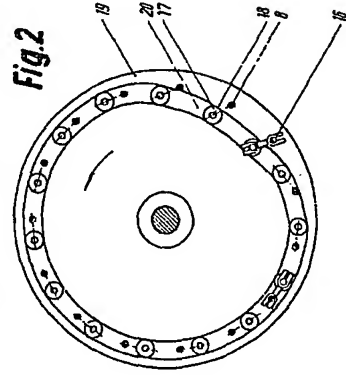


Fig. 3

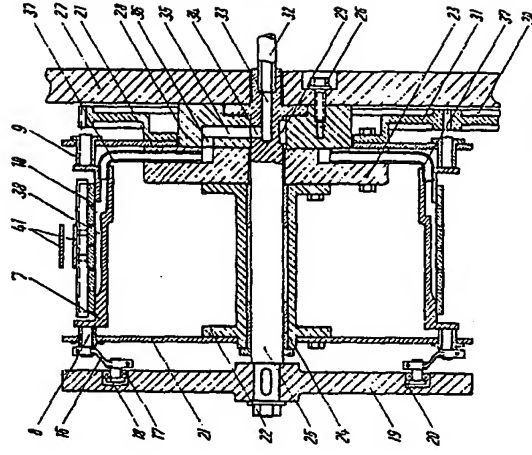


Fig. 4

